

Having described the invention, the following is claimed:

1b
A3

1. A method of joining current collector tabs from a multi-cell Li-ion or Li-ion polymer battery, comprising the steps of:

a) stacking a plurality of cell sections, said cell sections being essentially flat and having at least one flat, metallic current collector tab extending therefrom, said cell sections when stacked forming a cell body having outwardly facing planar surfaces, with said tabs extending from an end of said cell body in aligned, spaced-apart, parallel relationship;

b) gathering said tabs into a stack at a location offset from said cell body;

c) compressing and welding ends of said tabs together at said location to form a tab weldment; and

d) folding said tabs about an axis disposed between and parallel to said planar surfaces to position said tab weldment adjacent to said end of said cell body with said tabs and said tab weldment disposed within a space defined by said planar surfaces.

2. A method as defined in claim 1, further comprising a step of wrapping a metal strip around said stack of tabs prior to welding the ends of said tabs, said metal lead forming a battery lead.

3. A method as defined in claim 2, further comprising a step of trimming the ends of said tabs subsequent to welding the ends of said tabs, and prior to folding said tabs.

4. A method as defined in claim 3, wherein said cell sections are comprised of a plurality of bi-cell sections, each bi-cell section comprised of an anode section disposed between two cathode sections.

5. A method as defined in claim 4, wherein said cell sections are comprised of a plurality of cathode sections and a plurality of anode sections.

6. A method as defined in claim 3, further comprising a step of wrapping a portion of said battery lead over said tab weldment, wherein said portion of said battery lead is disposed between said tab weldment and said cell sections.

7. A method as defined in claim 6, wherein said step of welding is performed by ultrasonic welding.

8. A multi-cell Li-ion or Li-ion polymer battery, comprised of:

a plurality of generally planar cell sections, each cell section having at least one flat, metallic current collector tab extending therefrom, said cell sections being stacked one on another to form a cell body having a planar upper surface and a planar lower surface;

a plurality of said current collector tabs being aligned in spaced-apart relationship between said upper planar surface and said lower planar surface, and extending from one side of said cell body, each of said tabs having a free end and an intermediate portion; and

a tab weldment joining the free ends of said tabs but leaving said intermediate portions of said tabs unattached to each other, said tabs welded together when said tabs are stacked together at a location offset from said cell body, such that said tabs are folded into a generally U-shaped configuration with said unattached intermediate portions forming a smooth layered, generally U-shaped structure with said tab weldment disposed adjacent said one side of said cell body.

9. A multi-cell Li-ion or Li-ion polymer battery as defined in claim 8, further comprising a lead attached to said tab weldment.

10. A multi-cell Li-ion or Li-ion polymer battery as defined in claim 9, wherein said lead is a thin, metallic strip that is welded to said tab weldment.

11. A multi-cell Li-ion or Li-ion polymer battery as defined in claim 10, wherein a portion of said metallic strip is disposed between said tab weldment and said one side of said cell body.

12. A multi-cell Li-ion or Li-ion polymer battery as defined in claim 11, wherein said metallic strip is wrapped around said tab weldment.

13. A multi-cell Li-ion or Li-ion polymer battery as defined in claim 12, wherein said collector tabs are comprised of metallic mesh and said lead is a strip of solid metal having a width approximately equal to the width of said current collector tabs.

14. A multi-cell Li-ion or Li-ion polymer battery, comprised of:
 a plurality of generally planar cathode sections each having at least one flat, metallic cathode current collector tab extending therefrom;
 a plurality of generally planar anode sections each having at least one flat, metallic anode current collector tab extending therefrom, said cathode and anode sections being stacked together to form a cell body;

a plurality of said cathode current collector tabs being aligned and extending from one side of said cell body, each of said cathode current collector tabs having a free end and an intermediate portion;

a plurality of said anode current collector tabs being aligned and extending from one side of said cell body, each of said anode current collector tabs having a free end and an intermediate portion;

a cathode tab weldment joining the free ends of said cathode current collector tabs but leaving said intermediate portions of said cathode current collector tabs unattached to each other, said cathode current collector tabs welded together when said cathode current collector tabs are stacked together at a location offset from said cell body, such that said cathode current collector tabs are folded into a generally U-shaped configuration with said unattached intermediate portions forming a smooth layered, generally U-shaped structure with said cathode tab weldment disposed adjacent said one side of said cell body; and

an anode tab weldment joining the free ends of said anode current collector tabs but leaving said intermediate portions of said anode current collector tabs unattached to each other, said anode current collector tabs welded together when said anode current collector tabs are stacked together at a location offset from said cell body, such that said anode current collector tabs are folded into a generally U-shaped configuration with said unattached intermediate portions forming a smooth layered, generally U-shaped structure with said anode tab weldment disposed adjacent said one side of said cell body.

15. A multi-cell Li-ion or Li-ion polymer battery as defined in claim 14, further comprising a strip of metal attached to said cathode tab weldment to form a cathode battery lead.

16. A multi-cell Li-ion or Li-ion polymer battery as defined in claim 15, further comprising a strip of metal attached to said anode tab weldment to form an anode battery lead.

17. A multi-cell Li-ion or Li-ion polymer battery as defined in claim 16, wherein said cathode current collector tabs and said anode current collector tabs are formed of a metal mesh selected from the group consisting of copper and aluminum and said metal strips are selected from the group consisting of copper, aluminum and nickel.

18. A multi-cell Li-ion or Li-ion polymer battery as defined in claim 17, wherein said metal strips are wrapped on said cathode tab weldment and said anode tab weldment, wherein a portion of each respective metal strip is disposed between said anode tab weldment and said one side of said cell body and between said cathode tab weldment and said one side of said cell body.

03
ju

03
ju